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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,184

07/15/2003

Mitsuru Ozono

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EXAMINER

OSELE, MARK A

ART UNIT

PAPER NUMBER

1791

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/620,184	Applicant(s) OZONO ET AL.	
	Examiner Mark A. Osele	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09222008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication 2001-118862 (Akira) in view of U.S. Patent 6,709,543 (Kurosawa) and either U.S. Patent Publication 2001/0029088 (Odajima et al.) or U.S. Patent Publication 2003/0070517 (Tsujimoto). Akira shows a method and apparatus for picking up a semiconductor chip, 3a, adhered to a sheet, 1, by using a pick up head, 4a, the apparatus comprising: a holding table for holding the sheet, 1, a sheet exfoliation mechanism, 8a, with a suction surface includes a plurality of grooves, 7a, and a boundary portion which partitions the adjacent grooves wherein the boundary portions are in the same flat plane as the suction surface and abutted against a lower surface of the sheet, 1, and support the sheet during vacuum-sucking through the suction surface to exfoliate the sheet from the semiconductor chip, 3a (See Fig. 3). Akira further shows that when the vacuum-sucking is performed, the sheet is in a flat plane abutted against the suction surface of the exfoliation mechanism. Akira fails to show the semiconductor chip to be bent.

Kurosawa teaches that it has become desirable to make semiconductor chips thin in order to fit into thin packages (column 2, lines 6-10) and that thin semiconductor

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chips are deformed together with the adhesive sheet when suction is applied to the sheet to exfoliate the sheet from the chip (column 2, lines 17-22, 30-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use thin semiconductor chips in the apparatus of Akira because Kurosawa teaches the demands of industry for thin chips. Furthermore, the thin chips of the references as combined would be deformed along with the adhesive sheet using only vacuum suction force during the exfoliation vacuum-sucking step of Akira as shown by Kurosawa.

Kurosawa also shows the conventional arrangement of a sheet exfoliation mechanism located beneath a sheet holding table and moving the sheet exfoliation mechanism upward to abut against the adhesive sheet (Figs. 18A, 19A, 20A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the sheet exfoliation mechanism of Akira beneath the sheet holding table because this conventional arrangement allows for movement of all portions of the sheet over the exfoliation mechanism to exfoliate all of the chips from the adhesive sheet.

Odajima et al. shows that tapes can be removed from a wafer with an angle either aligned with an edge of the chips (Fig. 5a) or aligned with the diagonal of the chips from a corner thereof (Fig. 5b). This diagonal angle is 45° respective to the side of the chips. Tsujimoto teaches that it is advantageous to peel adhesive tapes from the corners of chips to avoid breaking the chips (paragraphs 0009 and 0013). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the bent range in a direction with a predetermined angle of about 45 degrees with respect to the side of the chip of the references as combined because because Odajima

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et al. teaches that peeling tapes from chips at either a 45 degree angle or a 90 degree angle with respect to the side of a chip are functionally equivalent alternate expedients and Tsujimoto teaches that peeling a tape from a chip at a 45 degree angle with respect to the side of a chip lessens the chance of breaking a chip.

Regarding claims 7 and 8, the semiconductor chip of the references as combined is rectangular and corner portions of the chip are not positioned directly above the boundary portions.

Regarding claim 9, Kurosawa further shows a plurality of different exfoliating tools for different types of semiconductor chips. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the exfoliating tools of the references as combined freely interchangeable on the exfoliation mechanism to make the apparatus flexible as different chips or adhesive sheets are used without requiring a completely different apparatus for each type of chip.

Response to Arguments

3. Applicants' arguments filed September 22, 2008 have been fully considered but they are not persuasive.

Applicant's arguments, see pages 7-8, filed September 22, 2008, with respect to the rejection of claims 1, 2 and 11 over Kurosawa in view of either Odajima et al. or Tsujimoto have been fully considered and are persuasive in light of the amendments to claims 1 and 11. The rejection of claims 1-2 and 11 has been withdrawn.

Applicants argue that neither Odajima et al. teaches away from the thrust pins of Kurosawa, but Kurosawa is only being included in the rejection for its showing that thin semiconductor chips are deformed together with the adhesive sheet when suction is applied to the sheet to exfoliate the sheet from the chip. The combination of references in paragraph 2 above use only the flat holding table with a suction surface includes a plurality of grooves of Akira, not the thrust pins of Kurosawa.

Applicants also argue that the thrust pins, of Kurosawa, not the vacuum suction force bends the semiconductor chip. In the office action of December 13, 2006 this same argument was addressed and the response is repeated here as follows: a review of Figs. 18A-21A of Kurosawa shows the deflection stages of the semiconductor chip. In Fig. 18A the chip is flat. In Fig. 19A thrust pins push the outer edges of the chip upward while vacuum pulls the center of the adhesive tape and the center of the chip downward. If no vacuum forces were affecting the chip at this point, the chip would remain flat due to its inherent rigidity and only adhered to the adhesive tape where the chip contacts the thrust pins 24a. All other areas of the chip would be delaminated from the adhesive tape as the flexible tape would be drawn downward by vacuum away from the back surface of the chip. Similarly, in Fig. 20A, the chip would remain in the same imaginary orientation described above, flat in a plane contacting the highest thrust pins, 24a, only while separated from the tape, being pulled downward at all other locations, including at the lower oriented thrust pin, 24c. If vacuum were not effecting the shape of the semiconductor chip, there would only be two figures, Fig. 18A and Fig. 21A; the intermediate stages of Fig. 19A and Fig. 20A would not occur.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Osele whose telephone number is 571-272-1235. The examiner can normally be reached on M-F 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark A Osele/
Primary Examiner, Art Unit 1791

September 27, 2008